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Calhoun et al.

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(54) **PULLING GRIP ASSEMBLY**

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H02G 1/08 (2006.01)

(52) **U.S. Cl.**
CPC ***H02G 1/083*** (2013.01); ***H02G 1/081*** (2013.01); *H02G 1/08* (2013.01)

(58) **Field of Classification Search**
CPC H02G 1/081; H02G 1/08; H02G 1/083
USPC ..... 254/134.3 R, 134.3 CL, 134.3 FT
See application file for complete search history.

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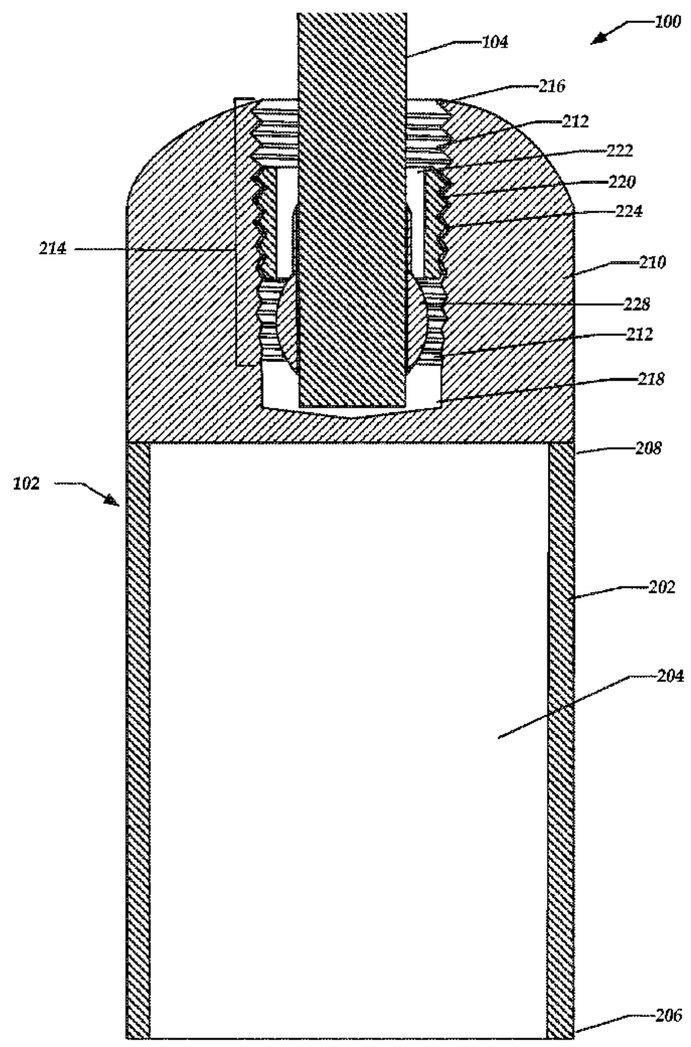
(57) **ABSTRACT**

A pulling grip assembly and methods, systems, and apparatuses for constructing the pulling grip assembly are disclosed. The pulling grip assembly can include a pulling grip. The pulling grip can include an elongated body portion and a lug portion. The lug portion can include a blind hole for receiving an assembly including a hollow fastening member and a pulling cable retained within the hollow fastening member.

7 Claims, 8 Drawing Sheets



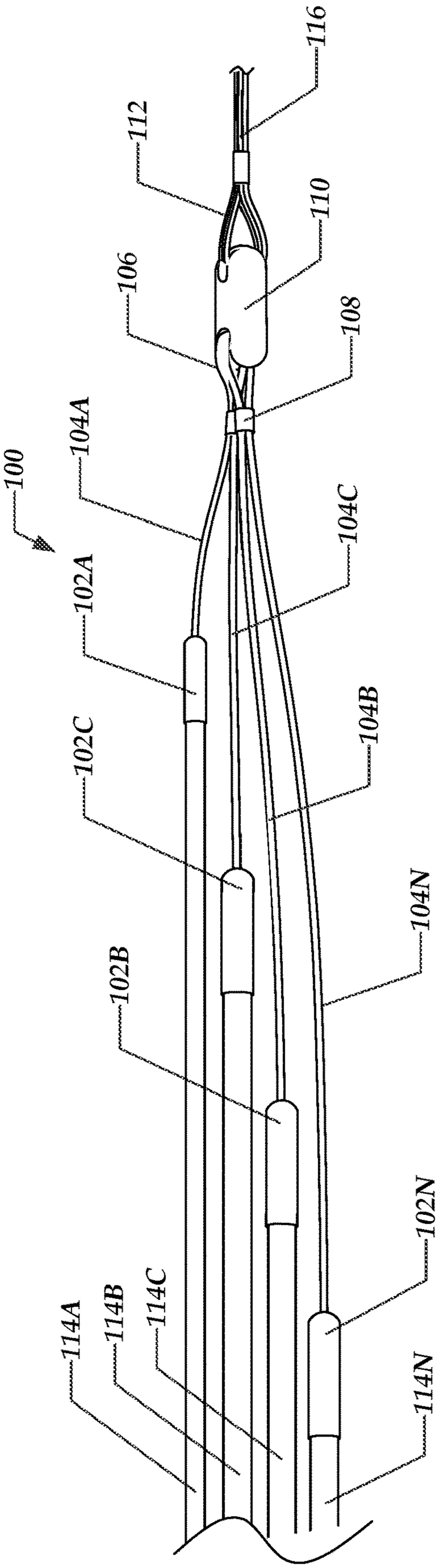
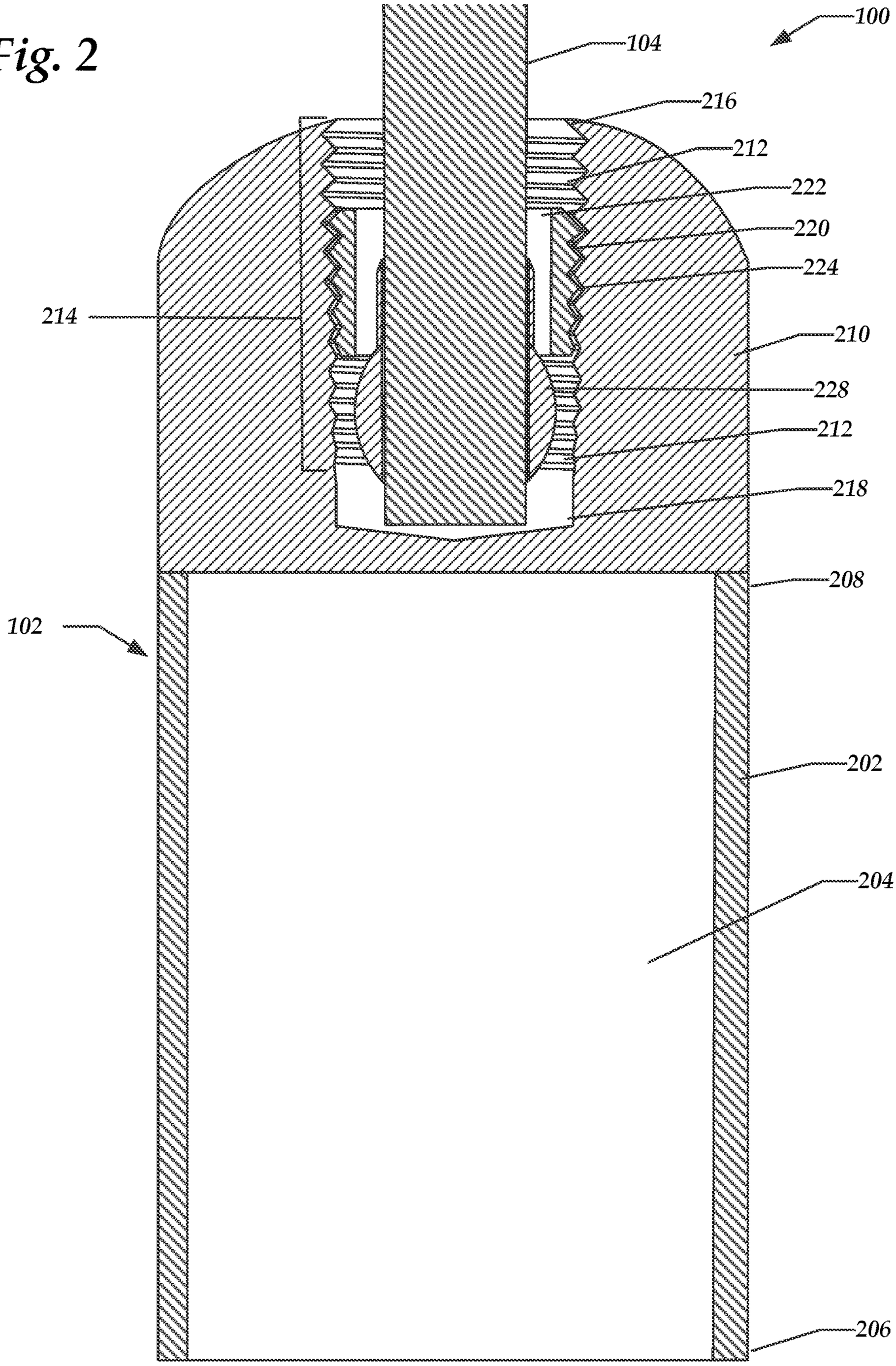

116
112
110
106
108
104A
100
102A
104C
102C
104B
102B
104N
102N
114A
114B
114C
114N

Fig. 1

Fig. 2


100
104
216
212
222
220
224
214
210
228
212
218
208
102
202
204
206

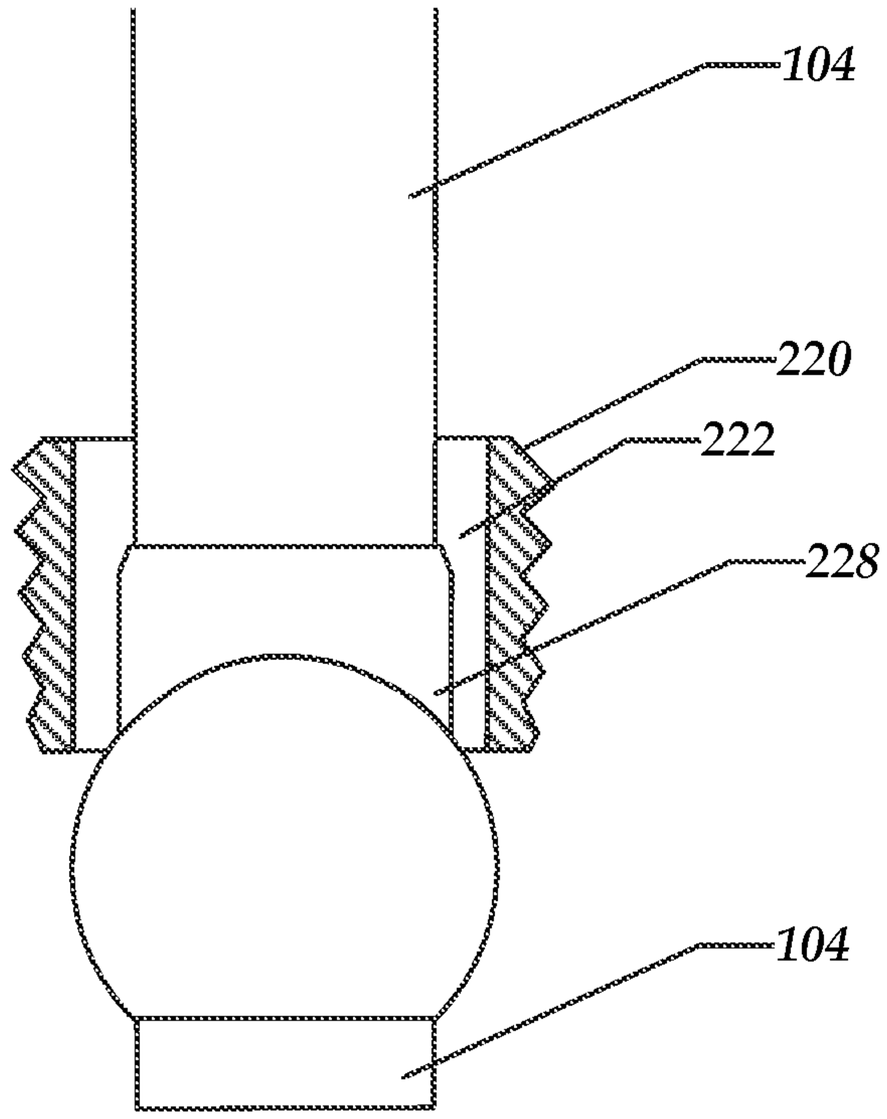


Fig. 3A

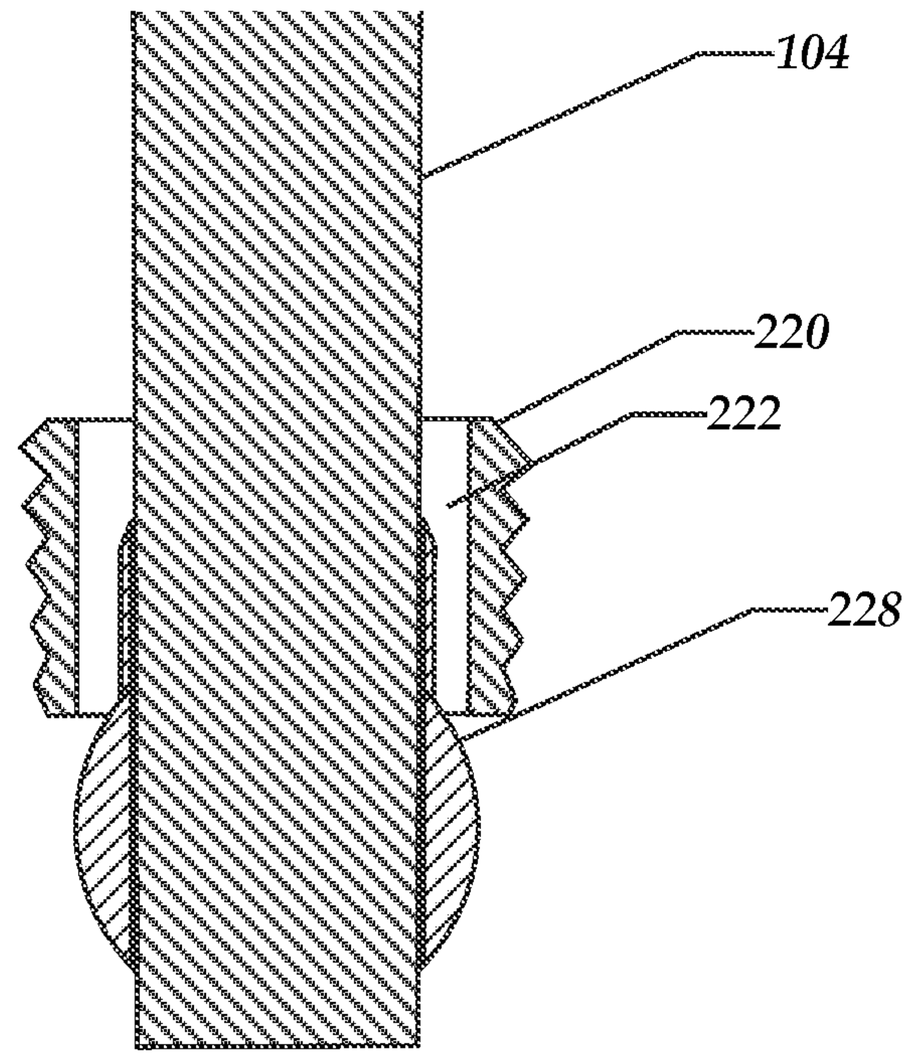


Fig. 3B

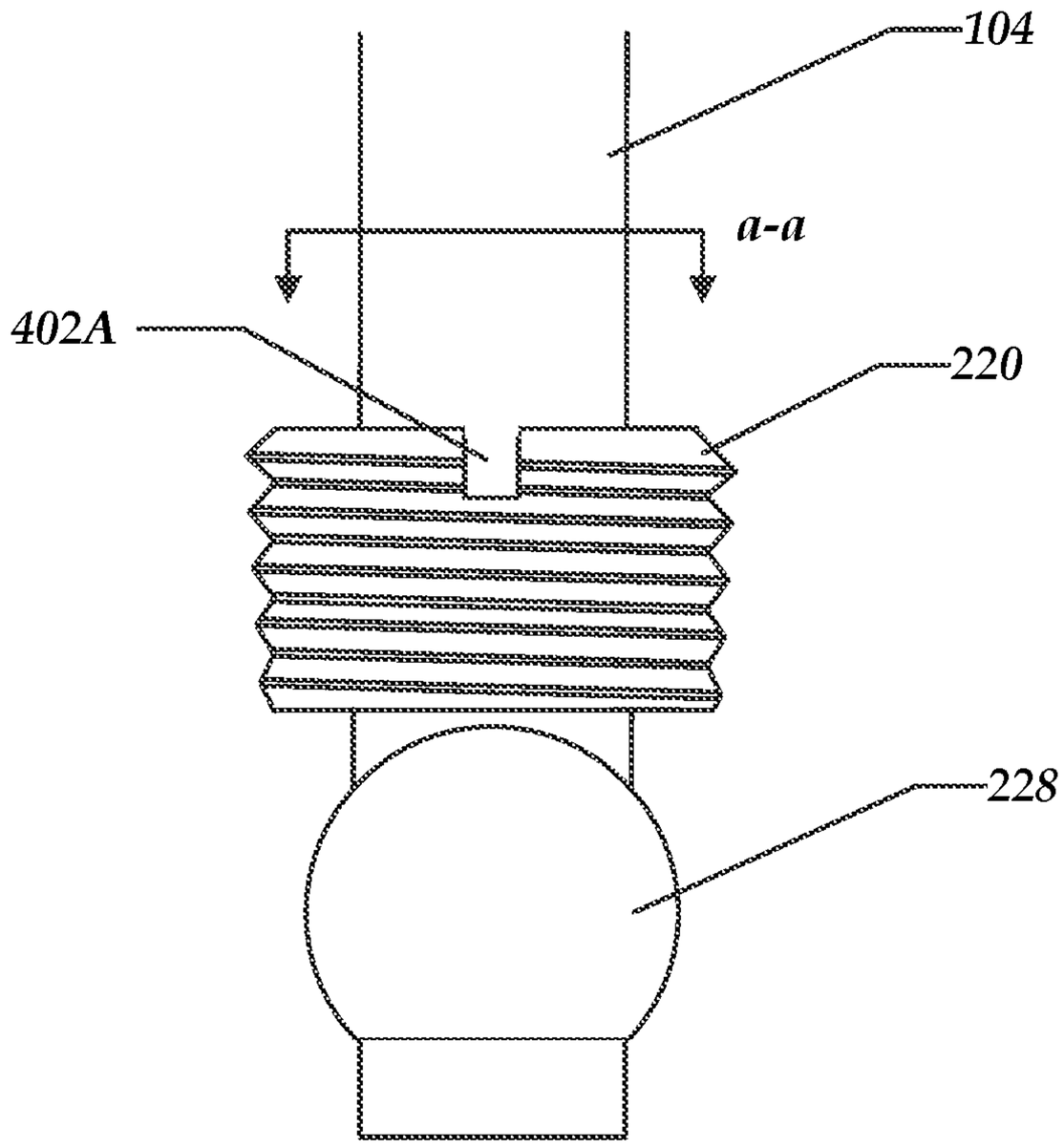


Fig. 4A

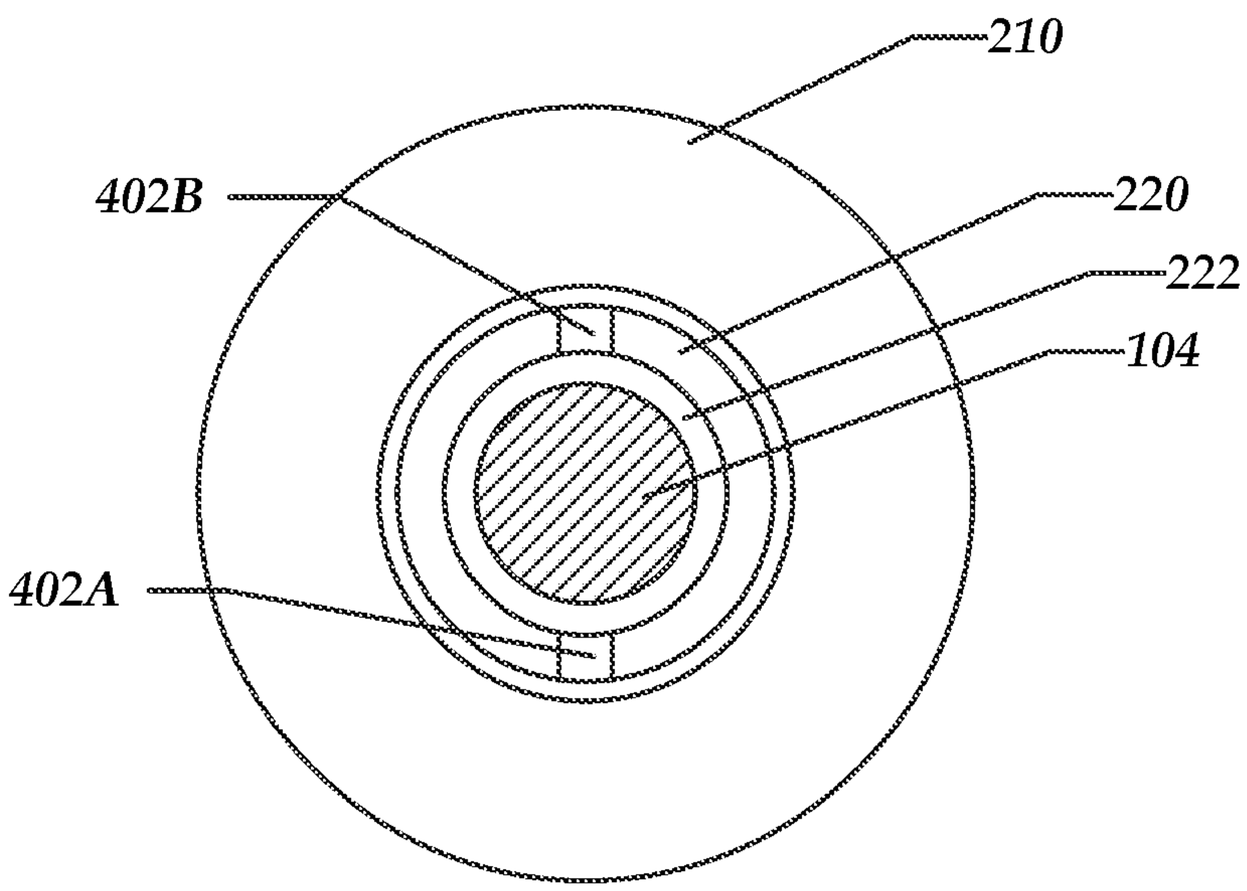


Fig. 4B

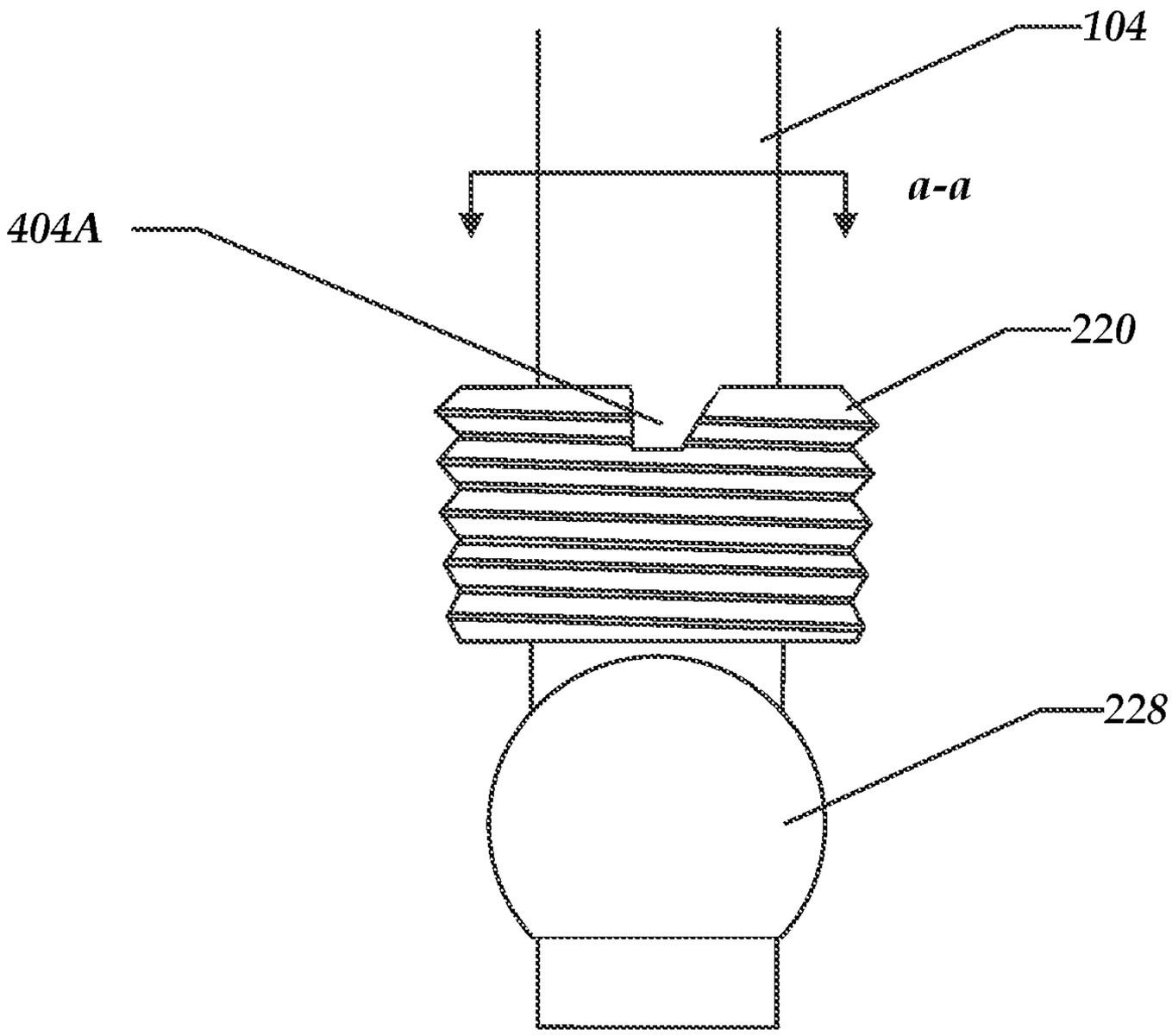


Fig. 4C

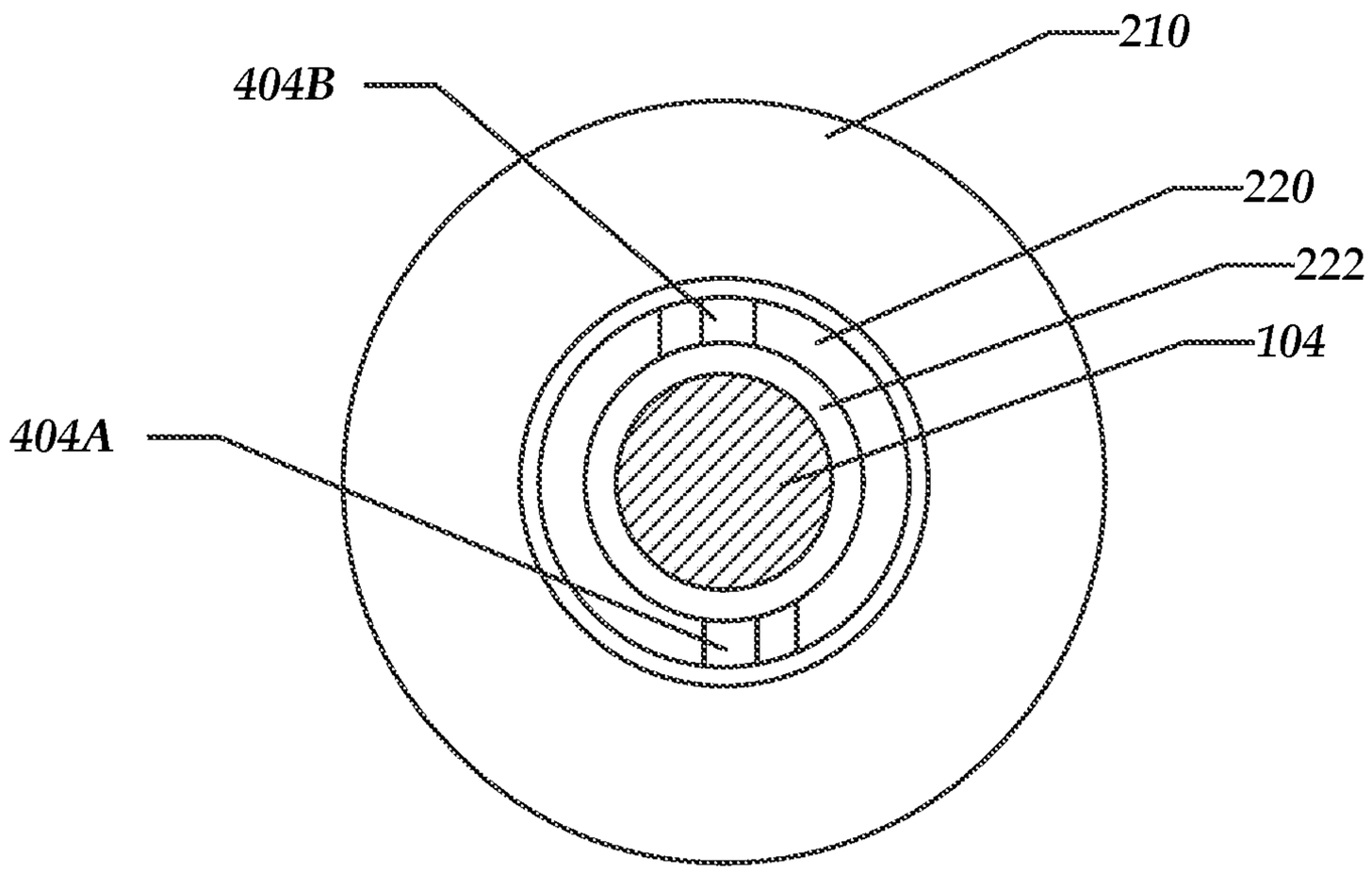


Fig. 4D

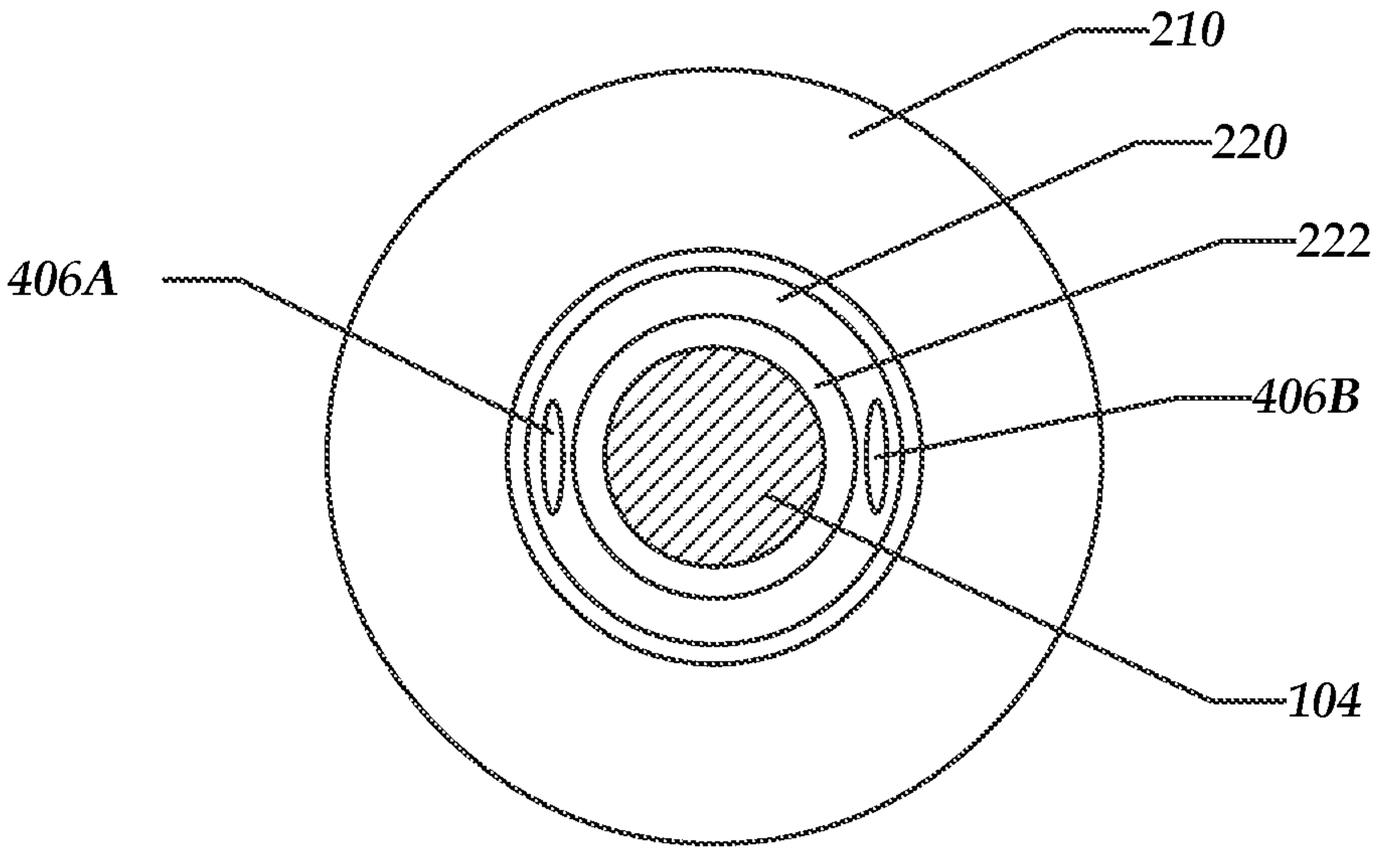


Fig. 4E

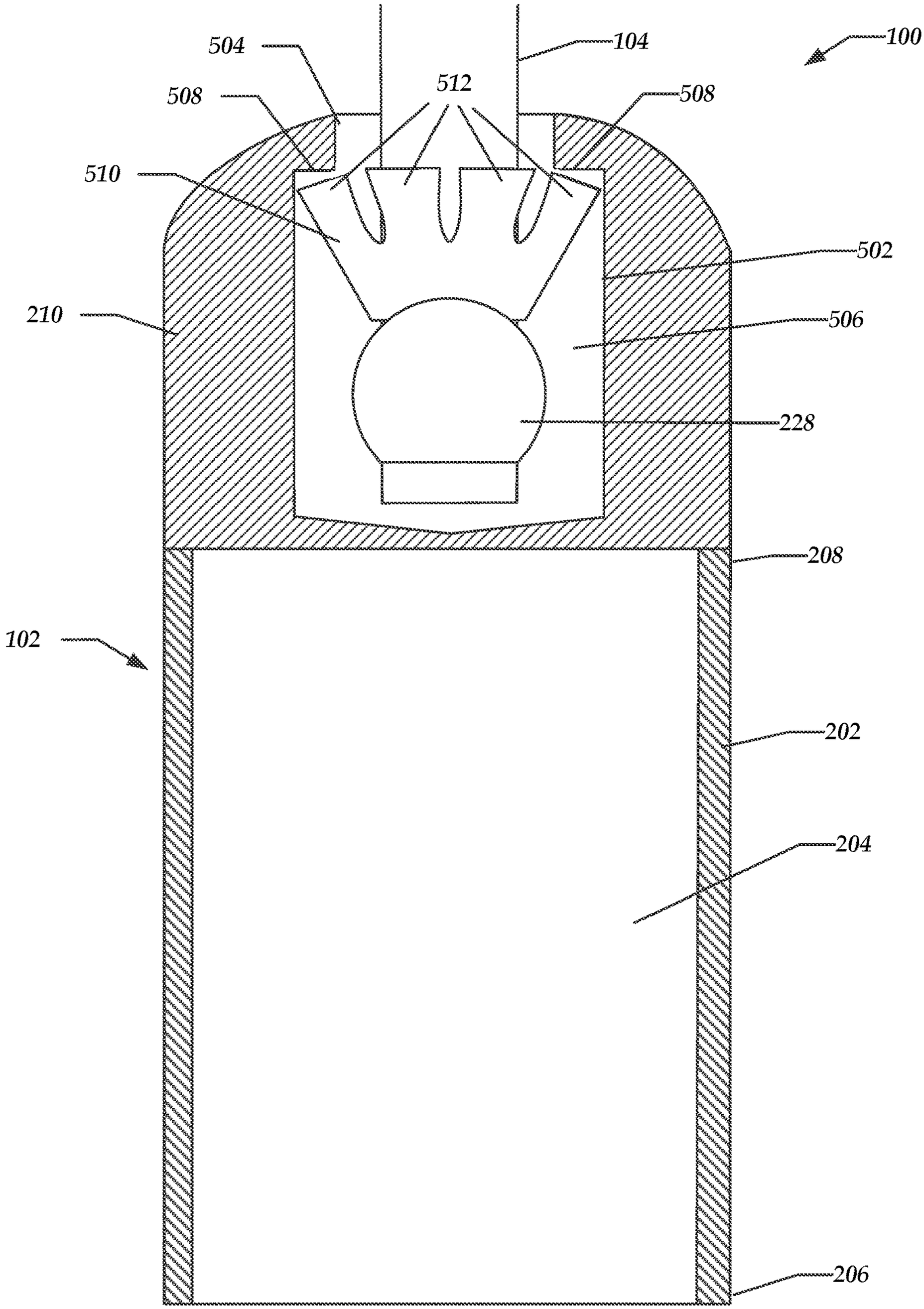


Fig. 5

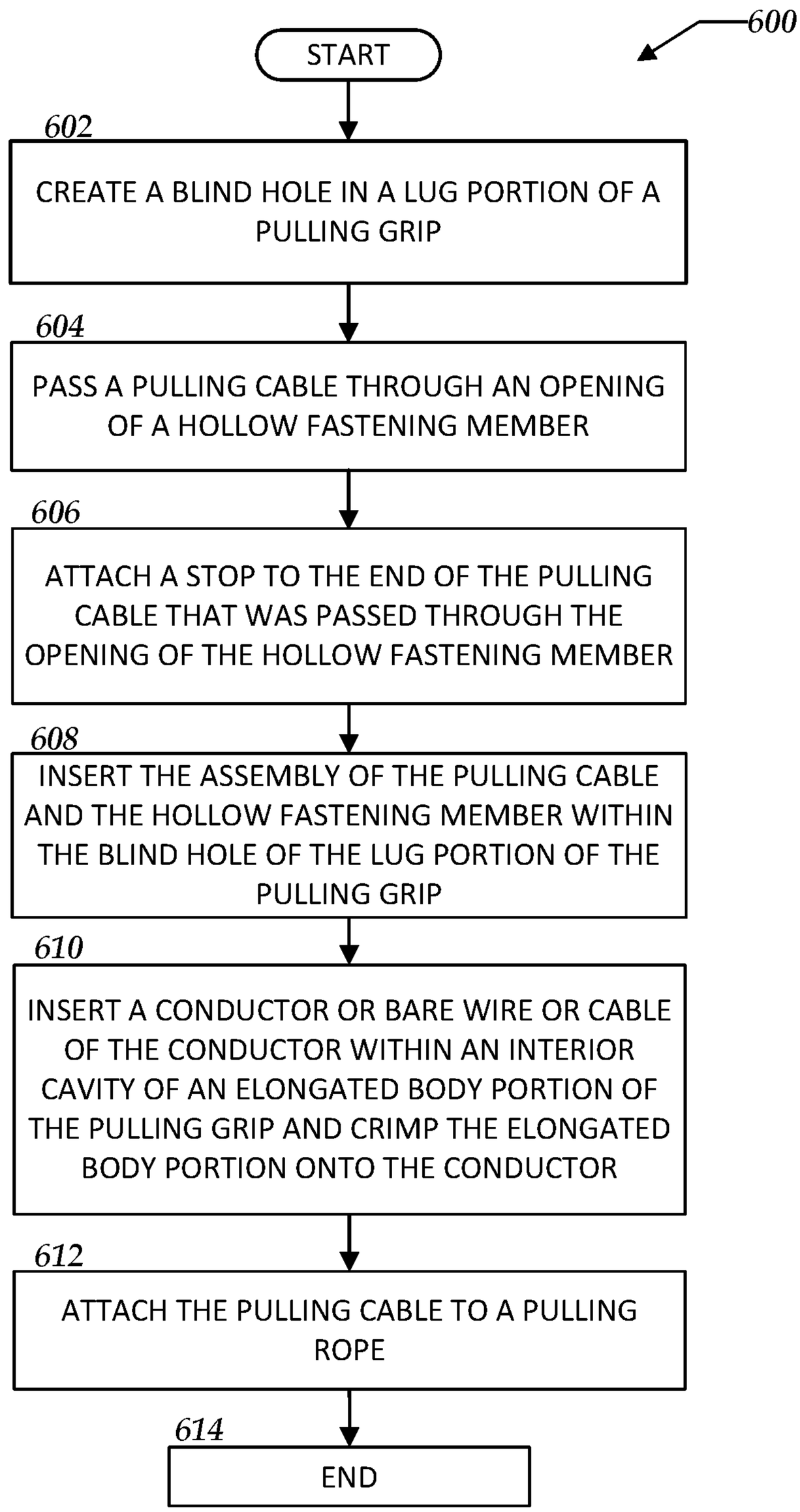

600
START
602
CREATE A BLIND HOLE IN A LUG PORTION OF A PULLING GRIP
604
PASS A PULLING CABLE THROUGH AN OPENING OF A HOLLOW FASTENING MEMBER
606
ATTACH A STOP TO THE END OF THE PULLING CABLE THAT WAS PASSED THROUGH THE OPENING OF THE HOLLOW FASTENING MEMBER
608
INSERT THE ASSEMBLY OF THE PULLING CABLE AND THE HOLLOW FASTENING MEMBER WITHIN THE BLIND HOLE OF THE LUG PORTION OF THE PULLING GRIP
610
INSERT A CONDUCTOR OR BARE WIRE OR CABLE OF THE CONDUCTOR WITHIN AN INTERIOR CAVITY OF AN ELONGATED BODY PORTION OF THE PULLING GRIP AND CRIMP THE ELONGATED BODY PORTION ONTO THE CONDUCTOR
612
ATTACH THE PULLING CABLE TO A PULLING ROPE
614
END

Fig. 6

PULLING GRIP ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Application No. 62/351,686, entitled "Pulling Grip Assembly," filed Jun. 17, 2016, which is incorporated herein by reference in its entirety.

BACKGROUND

Multiple conductor cabling consisting of multiple, independent wires or conductors are an integral part of many systems, including electrical and power systems. Such cabling may be installed by pulling the independent conductors in parallel through pipe or conduit over long distances. A pulling rope running through the conduit is attached to each conductor, and the pulling rope is pulled through the conduit, drawing the multiple conductor cabling from spools or other delivery mechanisms and through the conduit. The amount of force required to pull several conductors through a lengthy conduit, potentially with many bends or turns, may be substantial, and if the force is applied to the cabling improperly, one or more conductors may be damaged during the pull. Such damage may hamper performance of the multiple conductor cabling or present safety issues. In addition, finding and repairing the damaged portions of the conductors may be prohibitively expensive or physically impossible, and may necessitate replacement of the entire cabling.

The conductors may be attached to the pulling rope through a pulling grip assembly. The pulling grip assembly may include a pulling grip attached to each conductor and a pulling cable or lanyard that attaches each pulling grip to the pulling rope. Typically, the pulling grip has a first end and a second end and defines an interior cylindrical cavity into which a conductor may be inserted, via the first end, for attaching the pulling grip to the conductor. The second end of the pulling grip may define an aperture that the pulling cable or lanyard can be passed through for attachment to the pulling grip. Based on this construction, any moisture or debris that the pulling grip encounters can gain access to the interior cylindrical cavity of the pulling grip, via the aperture of the pulling grip, and ultimately the conductor on which the pulling grip is attached, causing damage and capacitive alterations to the conductor.

SUMMARY

The present disclosure is directed to a pulling grip assembly and methods, systems, and apparatuses for constructing the pulling grip assembly. According to various embodiments of the concepts and technologies described herein, the pulling grip assembly can include a pulling grip. The pulling grip can include an elongated body portion and a lug portion. The lug portion can comprise a blind hole for receiving an assembly. The pulling grip assembly can further include the assembly. The assembly can include a hollow fastening member and a pulling cable retained within the hollow fastening member.

The present disclosure is further directed to a method for constructing a pulling grip assembly. According to various embodiments, a pulling cable is retained within a hollow fastening member to form an assembly of the pulling cable and the hollow fastening member. The assembly of the pulling cable and the hollow fastening member can be secured within a blind hole of a lug portion of a pulling grip.

This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to be used to limit the scope of the claimed subject matter. Furthermore, the claimed subject matter is not limited to implementations that solve any or all disadvantages noted in any part of this disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a plurality of pulling grip assemblies attached to a plurality of corresponding conductors, a clevis, and a pulling rope, according to an illustrative embodiment.

FIG. **2** illustrates a cross-sectional view of a pulling grip assembly **100**, according to a first illustrative embodiment.

FIGS. **3**A-**3**B illustrate an assembly of the hollow fastening member and the pulling cable with a cross sectional view of the hollow fastening member and a front view of the pulling cable and the stop in FIG. **3**A, and an assembly of the hollow fastening member and the pulling cable with a cross sectional view of the hollow fastening member as well as a cross sectional view of the pulling cable and the stop in FIG. **3**B, all according to the first illustrative embodiment.

FIG. **4**A illustrates a full view of the assembly of the hollow fastening member and the pulling cable, according to the first illustrative embodiment, with a first type of drives.

FIG. **4**B illustrates a cross section view of the assembly of the hollow fastening member and the pulling cable along line a-a of FIG. **4**A, according to the first illustrative embodiment.

FIG. **4**C illustrates a full view of the assembly of the hollow fastening member and the pulling cable, according to the first illustrative embodiment, with a second type of drives.

FIG. **4**D illustrates a cross section view of the assembly of the hollow fastening member and the pulling cable along line a-a of FIG. **4**C, according to the first illustrative embodiment.

FIG. **4**E illustrates a cross section view of the assembly of the hollow fastening member and the pulling cable, according to the first illustrative embodiment, with a third type of drives.

FIG. **5** illustrates a cross-sectional view of a pulling grip assembly **100**, according to a second illustrative embodiment.

FIG. **6** is a flow diagram illustrating aspects of a method for constructing a pulling grip assembly, according to illustrative embodiments.

DETAILED DESCRIPTION

The following detailed description is directed to a pulling grip assembly and methods, systems, and apparatuses for constructing the pulling grip assembly. This description provides various components, one or more of which may be included in particular implementations of the pulling grip assembly and the methods, systems, and apparatuses for constructing the pulling grip assembly. In illustrating and describing these various components, however, it is noted that implementations of the pulling grip assembly and the methods, systems, and apparatuses for constructing the pulling grip assembly may include any combination of these components, including combinations other than those shown in this description.

FIG. **1** illustrates a plurality of pulling grip assemblies, denoted generally at **100**, attached to a plurality of corresponding insulated conductors **114**A-**114**N, a clevis **110**, and a pulling rope **116**. Respective pulling grips **102**A-**102**N (collectively, pulling grips **102** or used singularly as pulling grip **102**) of the pulling grip assemblies **100** are shown affixed to the corresponding insulated conductors **114**A-**114**N (collectively, insulated conductors **114** or used singularly as insulated conductor **114**). In overview, the pulling grips **102** serve to attach the insulated conductors **114** to respective pulling cables or lanyards **104**A-**104**N (collectively, pulling cables **104** or used singularly as pulling cable **104**) of the pulling grip assemblies **100**. The pulling cables **104** may be constructed of any suitable metallic or nonmetallic material, and may be coated or impregnated with friction-reducing compounds. Without limiting possible implementations, the pulling cables **104** may also represent pulling ropes, pulling members, strength members, or the like.

The individual pulling cables **104** may include loops, referenced collectively at **106**, which may be formed by suitable crimps, swages, or other attachment means (denoted collectively at **108**). In turn, any number of the pulling cables **104** may be connected to the clevis **110**. The clevis **110** may facilitate attachment of the pulling cables **104** to the pulling rope **116**. The pulling rope **116** may include a loop **112** facilitating attachment of the pulling rope **116** to the clevis **110**. The clevis **110** may be constructed of any suitable metallic or nonmetallic materials, chosen as appropriate for the loads anticipated to be borne by the clevis **110** during pulls of the completed pulling grip assembly through conduit. In addition, implementations of the clevis **110** may be dimensioned and shaped differently from the examples shown in FIG. **1**, without departing from the scope and spirit of the present description. The clevis **110** may be characterized as a "swivel" or "swiveling" clevis. For example, during a given pull, the pulling cables **104** and/or the pulling rope **116** may twist axially, experiencing forces as the pull proceeds. However, in implementations where the clevis **110** is a swiveling clevis, the swiveling clevis may serve to isolate the pulling cables **104** and the pulling rope **116** from each other, allowing, for example, the pulling cables **104** to twist axially relative to the pulling rope **116**, without also exposing the pulling rope **116** to those same twisting forces.

In different possible implementations, a given pulling cable **104** may be attached to one or two of the pulling grips **102**. For example, the pulling cables **104**B and **104**N may be the same pulling cable, with one end attached to the pulling grip **102**B and the other end attached to the pulling grip **102**N. This may reduce the number of loops **106** passing through the clevis **110**, by attaching two pulling grips **102** to a given pulling cable **104**. Finally, the clevis **110** may be attached to the loop **112** formed by the pulling rope **116**.

Turning now to FIG. **2**, the pulling grip assembly **100** will be described in detail in accordance with a first illustrative embodiment. According to embodiments, the pulling grip assembly **100** includes a pulling grip, such as the pulling grip **102**, a hollow fastening member **220**, and a pulling cable, such as the pulling cable **104**. The pulling grip **102** may generally include a somewhat elongated body portion **202**, which defines an interior cavity **204** along at least part of the elongated body portion **202**. According to exemplary embodiments, the elongated body portion **202** includes a first end **206** and a second end **208**. A conductor **114**, or the bare cable or wire of the conductor **114** that is exposed when a portion of insulation of the conductor **114** is stripped away, may be inserted into the interior cavity **204**, via the first end **206** of the elongated body portion **202**, and the elongated body portion **202** may be crimped, swaged, or otherwise secured to the bare cable or wire. Crimps may be applied to the elongated body portion **202** so that adjacent crimps have differing rotational alignments relative to one another, which may promote a more secure overall attachment between the pulling grip **102** and the bare cable or wire of the conductor **114**. Alternatively, the crimps may be applied to the elongated body portion **202** so that adjacent crimps have approximately the same rotational alignment relative to one another. In other implementation scenarios, the pulling grip **102** may include a wedging mechanism, set screws, or other mechanical mechanisms operative to secure the elongated body portion **202** to the exposed cable or wire of the conductor **114**.

According to exemplary embodiments, the pulling grip **102** also includes a lug portion **210** extending from the second end **208** of the elongated body portion **202**. Both the elongated body portion **202** and the lug portion **210** of the pulling grip **102** may be manufactured of a material such as aluminum or an alloy thereof. The pulling grip **102** may be manufactured using any suitable processes, including but not limited to, machining from a single piece of stock aluminum or other material, as well as forging, casting, molding, or the like. The lug portion **210** and the elongated body portion **202** may be integral with one another forming a unitary structure by virtue of being machined from a single piece of stock aluminum or other material. Alternatively, the lug portion **210** and the elongated body portion **202** may be machined as separate pieces that are attached to one another via an adhesive, welding, or other mechanical connection. According to embodiments, the lug portion **210** may have a female threaded portion (not shown) that engages a male threaded portion (not shown) of the elongated body portion **202**, or vice versa, to allow the lug portion **210** to be removably attached to the elongated body portion **202** so that the lug portion **210** can be removed and reused on another elongated body portion.

As illustrated in FIG. **2**, the lug portion **210** of the pulling grip **102** may include a threaded blind hole **212** that extends a specified depth through a portion of the lug portion **210** without breaking through to the interior cavity **204** of the elongated body portion **202** of the pulling grip **102** such that the threaded blind hole **212** remains sealed off from the interior cavity **204** of the elongated body portion **202** of the pulling grip **102**. The threaded blind hole **212** may be created in the lug portion **210** using a progressive tap, such as a pipe tap, that cuts internal threads that progressively get more shallow in depth as they proceed down a hole as illustrated by the internal threads, denoted generally at **214**, of the threaded blind hole **212** in FIG. **2**, which progressively get more shallow in depth as the internal threads **214** proceed from a first end **216** of the threaded blind hole **212** to a second end **218** of the threaded blind hole **212**. In particular, the internal threads **214** cut at and near the first end **216** of the threaded blind hole **212** extend further into the lug portion **210** than the internal threads **214** cut near the second end **218** of the threaded blind hole **212**.

The progressively more shallow depth of the internal threads **214** of the threaded blind hole **212** work to lock the hollow fastening member **220** into the threaded blind hole **212**. According to exemplary embodiments, the hollow fastening member **220** is a threaded insert defining an opening **222**, as illustrated by FIGS. **2** and **3**A-**3**B, for receiving a pulling cable, such as the pulling cable **104**, as discussed further below. The hollow fastening member **220** includes external threads **224** that mate with the internal

threads **214** of the threaded blind hole **212**, when the hollow fastening member **220** is screwed into the threaded blind hole **212**. As the hollow fastening member **220** is screwed further into the threaded blind hole **212**, at least a portion of the external threads **224** of the hollow fastening member **220** contact the more shallow threads at the second end **218** of the threaded blind hole **212**, causing a wedging action that creates a self-engaging bind as the hollow fastening member **220** encounters resistance and locks the hollow fastening member **220** within the threaded blind hole **212**. Alternatively, the hollow fastening member **220** may include an adhesive on the external threads **224** which locks the hollow fastening member **220** within the threaded blind hole **212** as the hollow fastening member **220** is screwed into the threaded blind hole **212**. The surface of the opening **222** of the hollow fastening member **220** may be smooth as illustrated in FIG. **2**, may include internal threads, or may include a combination of both. As used herein, the term "lock" means fixed in position such that removal or attempts at removal would damage and/or destroy surrounding members. For instance, when the hollow fastening member **220** is screwed into the threaded blind hole **212**, the hollow fastening member **220** is locked within the threaded blind hole **212** such that removal or attempts at removal of the hollow fastening member **220** from the threaded blind hole **212** would damage and/or destroy the lug portion **210**. According to other embodiments, the hollow fastening member **220** may be screwed into the threaded blind hole **212** in a manner that allows the hollow fastening member **220** to be removed without damaging or destroying the lug portion **210**.

Prior to screwing the hollow fastening member **220** into the threaded blind hole **212** of the lug portion **210** of the pulling grip **102**, a pulling cable, such as the pulling cable **104**, and the hollow fastening member **220** are assembled together. According to embodiments, the pulling cable **104** is first passed through the opening **222** of the hollow fastening member **220**. The end of the pulling cable **104** passed through the opening **222** is then inserted into an opening of a stop **228**, which is then crimped or otherwise secured to the end of the pulling cable **104** inserted through the opening of the stop **228**, as further illustrated in FIGS. **3**A and **3**B. According to exemplary embodiments, the stop **228** is a shank including a ball-shaped portion that has a diameter larger than the inner diameter of the hollow fastening member **220** such that once the stop **228** is secured to the end of the pulling cable **104** passed through the opening **222** of the hollow fastening member **220** and through the opening of the stop **228**, the pulling cable **104** is retained within the hollow fastening member **220**. As discussed above, according to embodiments, the hollow fastening member **220** is a threaded insert including external threads **224**. The outside diameter of the threaded insert used depends on the diameter of the threaded blind hole **212** tapped in the lug portion **210**. According to an exemplary embodiment, a threaded insert having an outside diameter of ¾ inch and an inside diameter of ¼ inch may be used.

Once the pulling cable **104** is secured within the hollow fastening member **220** by virtue of the stop **228**, the hollow fastening member **220** can be screwed and locked into the threaded blind hole **212** of the lug portion **210** to attach the pulling cable **104** to the pulling grip **102**, as illustrated in FIG. **2**. Although the pulling cable **104** is locked within the threaded blind hole **212** by virtue of being assembled with the hollow fastening member **220** as discussed above and illustrated in FIGS. **3**A and **3**B, the pulling cable **104** is still able to twist axially within the opening **222** of the hollow fastening member **220** as needed in response to forces experienced while being pulled through a conduit, which alleviates the potential of the conductors **114** on which the pulling grips **102** are attached from getting jammed within the conduit. Since the hollow fastening member **220** is locked within the threaded blind hole **212** of the lug portion **210**, any axial twisting of the pulling cable **104** is prevented from unscrewing the hollow fastening member **220** from the threaded blind hole **212**.

As illustrated in FIGS. **4**A and **4**B, and according to embodiments, the hollow fastening member **220** includes slot screw drives **402**A, **402**B for receiving a specialized screwdriver that, when rotated, screws the hollow fastening member **220** into the threaded blind hole **212** of the lug portion **210**. Alternatively, as illustrated in FIGS. **4**C and **4**D, the hollow fastening member **220** includes slanted slot screw drives **404**A, **404**B for receiving a specialized screwdriver that can be rotated clockwise to engage the hollow fastening member **220** and screw the same into the threaded blind hole **212** of the lug portion **210**, but is prevented from engaging the hollow fastening member **220** when rotated counterclockwise by virtue of the slant of the slanted slot screw drives **404**A, **404**B to further prevent the hollow fastening member **220** from being unscrewed from the threaded blind hole **212** by the specialized screwdriver. According to further embodiments and as illustrated in FIG. **4**E, the hollow fastening member **220** may include slot drives **406**A, **406**B for receiving a specialized tool that, when rotated, screws the hollow fastening member **220** into the threaded blind hole **212** of the lug portion **210**. Turning back to FIG. **2**, since the threaded blind hole **212** is sealed off from the interior cavity **204** of the elongated body portion **202**, any moisture or debris that may collect within the threaded blind hole **212** cannot pass through to the interior cavity **204** of the elongated body portion **202**.

Turning now to FIG. **5**, an alternative illustrative embodiment of the pulling grip assembly **100** is illustrated. According to embodiments, the pulling grip assembly **100** illustrated in FIG. **5** includes a pulling grip, such as the pulling grip **102**, a hollow fastening member **510**, and a pulling cable, such as the pulling cable **104**. The lug portion **210** of the pulling grip **102** illustrated in FIG. **5** includes a blind hole **502** that extends a specified depth through a portion of the lug portion **210** without breaking through to the interior cavity **204** of the elongated body portion **202** of the pulling grip **102** such that the blind hole **502** remains sealed off from the interior cavity **204** of the elongated body portion **202** of the pulling grip **102**. According to embodiments, a neck portion **504** of the blind hole **502** has a diameter that is smaller than the diameter of a body portion **506** of the blind hole **502** to create ridges **508** where the neck portion **504** and the body portion **506** connect together. According to some embodiments, the ridges **508** engage the hollow fastening member **510** and lock the hollow fastening member **510** within the blind hole **502** when the hollow fastening member **510** is inserted within the blind hole **502**, as discussed further below. Unlike the threaded blind hole **212** illustrated in FIG. **2**, the surface of the blind hole **502** illustrated in FIG. **5** may be smooth since the hollow fastening member **510** is locked within the blind hole **502** by the ridges **508** of the blind hole **502**.

According to some embodiments, the hollow fastening member **510** includes one or more petals or strips **512** that extend radially from the center of the hollow fastening member **510** and have a resting diameter when the hollow fastening member **510** is in a resting or original state as is illustrated in FIG. **5**, and that constrict inwardly towards the

center of the hollow fastening member **510** and have one or more constricted diameters when the petals **512** are placed under pressure when the hollow fastening member **510** is in one or more constricted states, such as when the hollow fastening member **510** is inserted within a diameter that is smaller than the resting diameter of the petals **512**. According to embodiments, the hollow fastening member **510** is constructed of spring steel or another material with high yield strength that gives the hollow fastening member **510** a spring-like quality and allows the hollow fastening member **510** to deform in response to pressures asserted on the petals **512** and then return to its original shape when the pressures are removed. This spring-like quality allows the hollow fastening member **510** to be inserted and locked into the blind hole **502**.

According to some embodiments, as the hollow fastening member **510** is inserted into the neck portion **504** of the blind hole **502**, the petals **512** of the hollow fastening member **510** come into contact with the neck portion **504** of the blind hole **502** and are biased inwardly towards the center of the hollow fastening member **510** by virtue of the neck portion **504** having a smaller diameter than the resting diameter of the petals **512** of the hollow fastening member **510**. The petals **512** of the hollow fastening member **510** continue to constrict inwardly as the hollow fastening member **510** is pushed further into the blind hole **502** until the constricted diameter of the petals **512** is compressed to a size that is smaller than the diameter of the neck portion **504** of the blind hole **502**, at which time the petals **512** are held in the constricted diameter by the neck portion **504** of the blind hole **502**, allowing the hollow fastening member **510** to be inserted through the neck portion **504** of the blind hole **502**. When the petals **512** of the hollow fastening member **510** move passed the neck portion **504**, the petals **512** spring outward from the center of the hollow fastening member **510** and back to the resting diameter since, according to embodiments, the body portion **506** of the blind hole **502** has a diameter that can accommodate the resting diameter of the petals **512** of the hollow fastening member **510**. Since the resting diameter of the petals **512** is larger than the diameter of the neck portion **504** of the blind hole **502**, the hollow fastening member **510** is maintained within the body portion **506** of the blind hole **502** by the ridges **508** of the blind hole **502**, locking the hollow fastening member **510** within the blind hole **502**. Alternatively, the hollow fastening member **510** may have a diameter that is sized to fit within the neck portion **504** of the blind hole **502** but may include retractable fins spaced around the diameter that extend outwardly from the hollow fastening member **510** when the hollow fastening member **510** is in a resting or original state and that retract inwardly towards the center of the hollow fastening member **510** when the hollow fastening member **510** is in a constricted state. For instance, as the hollow fastening member **510** moves through the neck portion **504** of the blind hole **502**, the retractable fins may retract inwardly towards the center of the hollow fastening member **510**, allowing the hollow fastening member **510** to be inserted through the neck portion **504**. When the retractable fins move passed the neck portion **504** and enter into the body portion **506** of the blind hole **502**, the retractable fins spring back outwardly from the hollow fastening member **510** and lock the hollow fastening member **510** into the body portion **506** of the blind hole **502** by virtue of the ridges **508**.

Prior to inserting and locking the hollow fastening member **510** into the blind hole **502** of the lug portion **210** of the pulling grip **102**, a pulling cable, such as the pulling cable **104** of the pulling grip assembly **100**, and the hollow fastening member **510** are assembled together. According to embodiments, the pulling cable **104** is first passed through an opening of the hollow fastening member **510**. The end of the pulling cable **104** passed through the opening of the hollow fastening member **510** is then inserted into an opening of the stop **228**, which is then crimped or otherwise secured to the end of the pulling cable **104** inserted through the opening of the stop **228**.

Once the pulling cable **104** is secured within the hollow fastening member **510** by virtue of the stop **228**, the hollow fastening member **510** can be inserted and locked into the blind hole **502** of the lug portion **210** to attach the pulling cable **104** to the pulling grip **102**, as illustrated in FIG. **5** and discussed above. Although the pulling cable **104** is locked within the blind hole **502** by virtue of being assembled with the hollow fastening member **510** as discussed above, the pulling cable **104** is still able to twist axially within the opening of the hollow fastening member **510** as needed in response to forces experienced while being pulled through a conduit, which alleviates the potential of the conductors **114** on which the pulling grips **102** are attached from getting jammed within the conduit.

Turning now to FIG. **6**, aspects of a method **600** for constructing a pulling grip assembly, such as the pulling grip assembly **100**, will be described, according to an illustrative embodiment. It should be understood that the operations of the methods disclosed herein are not necessarily presented in any particular order and that performance of some or all of the operations in an alternative order(s) is possible and is contemplated. The operations have been presented in the demonstrated order for ease of description and illustration. Operations may be added, omitted, and/or performed simultaneously, without departing from the scope of the concepts and technologies disclosed herein. It also should be understood that the methods disclosed herein can be ended at any time and need not be performed in its entirety.

The method **600** begins at operation **602**, where a blind hole, such as the threaded blind hole **212** or the blind hole **502**, is created in a lug portion, such as the lug portion **210**, of a pulling grip, such as the pulling grip **102**. As discussed above, the threaded blind hole **212** may be created using a progressive tap, such as a pipe tap, that cuts internal threads that progressively get more shallow in depth as they proceed down a hole as illustrated by the internal threads **214**. The threaded blind hole **212** or the blind hole **502** extends a specified depth through a portion of the lug portion **210** without breaking through to an interior cavity, such as the interior cavity **204**, of the elongated body portion **202** of the pulling grip **102** such that the threaded blind hole **212** or the blind hole **502** remains sealed off from the interior cavity **204** of the elongated body portion **202** of the pulling grip **102**.

From operation **602**, the method **600** proceeds to operation **604**, where a pulling cable, such as the pulling cable **104**, and a hollow fastening member, such as the hollow fastening member **220** or the hollow fastening member **510**, are assembled together by first passing the pulling cable **104** through an opening of the hollow fastening member **220**, **510**. From operation **604**, the method **600** proceeds to operation **606**, where a stop, such as the stop **228**, is then attached to the end of the pulling cable **104** that was passed through the opening of the hollow fastening member **220**, **510**. According to embodiments, the stop **228** is crimped or otherwise secured to the end of the pulling cable **104** that was passed through the opening of the hollow fastening member **220**, **510**. According to exemplary embodiments, the stop **228** is ball-shaped and has a general dimension that

is larger than the inner diameter of the hollow fastening member **220**, **510** such that once the stop **228** is secured to the end of the pulling cable **104** passed through the opening of the hollow fastening member **220**, **510**, the pulling cable **104** is retained within the hollow fastening member **220**, **510**.

From operation **606**, the method **600** proceeds to operation **608**, where the assembly of the pulling cable **104** and the hollow fastening member **220**, **510** is inserted within the blind hole **212**, **502** of the lug portion **210** of the pulling grip **102**. According to embodiments, the hollow fastening member **220** can be screwed and locked into the threaded blind hole **212** of the lug portion **210** to attach the pulling cable **104** to the pulling grip **102**, as illustrated in FIG. **2**. Alternatively, the hollow fastening member **510** can be pushed into and locked within the blind hole **502** of the lug portion **210** to attach the pulling cable **104** of the pulling grip **102**, as illustrated in FIG. **5**. Whether the pulling cable **104** is locked within the threaded blind hole **212** by virtue of being assembled within the hollow fastening member **220** or is locked within the blind hole **502** by virtue of being assembled within the hollow fastening member **510**, the pulling cable **104** is still able to twist axially within the hollow fastening member **220**, **510** as needed in response to forces experienced while being pulled through a conduit, which alleviates the potential of the conductors **114** on which the pulling grips **102** are attached from getting jammed within the conduit. From operation **608**, the method **600** may proceed to operation **610**, where a conductor, such as the conductor **114**, or a bare wire or cable of the conductor **114** is inserted within the interior cavity **204** of the elongated body portion **202** of the pulling grip **102** of the pulling grip assembly **100** that has been assembled via operations **602-608**, and the elongated body portion **202** is crimped or otherwise secured onto the bare wire or cable of the conductor **114**. In addition, from operation **610**, the method **600** may proceed to operation **612**, where the pulling cable **104** of the pulling grip assembly **100** may be attached to a pulling rope, such as the pulling rope **116**, in preparation for pulling the pulling grip assembly **100** with the conductor **114** attached through a conduit. From operation **612**, the method **600** proceeds to operation **614**, where the method **600** ends.

The subject matter described above is provided by way of illustration only and should not be construed as limiting. Various modifications and changes may be made to the subject matter described herein without following the example embodiments and applications illustrated and described, and without departing from the true spirit and scope of the present invention, which is encompassed in the following claims.

What is claimed is:

1. A pulling grip assembly comprising:

a pulling grip comprising

an elongated body portion, and

a lug portion comprising a blind hole, wherein the blind hole comprises internal threads progressing from a first end of the blind hole to a second end of the blind hole proximate the elongated body portion, and wherein at least a portion of the internal threads located proximate the second end of the blind hole extend less into the lug portion than at least a portion of the internal threads located proximate the first end of the blind hole in order to lock a hollow fastening member within the blind hole; and

the hollow fastening member defining an opening for receiving at least a portion of a pulling cable, wherein the hollow fastening member has a diameter smaller than a diameter of the lug portion of the pulling grip and a length that is shorter than a length of the blind hole of the lug portion, wherein the hollow fastening member comprises external threads, and wherein at least a portion of the external threads of the hollow fastening member bind with at least the portion of the internal threads located proximate the second end of the blind hole that extend less into the lug portion to lock the hollow fastening member completely within the blind hole such that unscrewing the hollow fastening member from the blind hole would damage at least a portion of the lug portion.

2. The pulling grip assembly of claim **1**, further comprising at least the portion of the pulling cable retained within the hollow fastening member.

3. The pulling grip assembly of claim **2**, wherein at least the portion of the pulling cable is retained within the hollow fastening member by a stop that is secured to an end of at least the portion of the pulling cable once the end of at least the portion of the pulling cable has passed through and is out of the opening defined by the hollow fastening member.

4. The pulling grip assembly of claim **3**, wherein the stop comprises a shank including a ball-shaped portion that has a diameter larger than a diameter of the opening defined by the hollow fastening member.

5. The pulling grip assembly of claim **1**, wherein the hollow fastening member comprises a plurality of slot screw drives.

6. The pulling grip assembly of claim **1**, wherein the hollow fastening member comprises a plurality of slanted slot screw drives.

7. The pulling grip assembly of claim **2**, wherein the pulling cable is able to twist axially when at least the portion of the pulling cable is retained within the opening of the hollow fastening member.

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